V. POTENTIAL ADVERSE IMPACTS TO CULTURAL RESOURCES ON DENALI HIGHWAY LANDS

There are numerous activities that could affect the cultural resources on Denali Highway lands. These activities include OHV use, erosion, vandalism, developmental impact, ice patch melting, and general use of the region by the public. The cultural resources of this region are vulnerable. The majority of them are archaeological sites that are very shallowly buried or exposed on the surface. The soil deposits are very thin in much of the Denali Highway region, with many areas having 30 centimeters (12 inches) or less of soil overlying glacial gravels. Thus archaeological sites are easily disturbed or destroyed by various ground disturbance processes.

In 1984 BLM implemented restrictions limiting OHVs to designated trails in the TLAD due to OHV damage to archaeological sites. Archaeological materials exposed by natural or human-induced erosion then become vulnerable to unauthorized collection.

Human Disturbance Factors

Off-Highway-Vehicle Use

The primary human ground-disturbing factor in the TLAD has been OHV use. OHVs make ruts, eroding soil and exposing artifacts. Loss of ground cover also encourages cryoturbation, churning up archaeological deposits and destroying stratigraphic context.

Early OHVs used in the region included four-wheel drive highway vehicles, tracked hunting vehicles, and tracked dozers. Some of the drier trails in the region, like the Maclaren Summit Trail (Figure 6) and the Landmark Gap Trail (Figure 8), appear to have been pioneered by four-wheel drive vehicles. Wetter trails, like Seven Mile Lake Trail (Figure 7) and Glacier Gap Lake Trail (Figures 8 and 9), may have been pioneered by tracked rigs, and later used by four-wheel drive vehicles. Other trails, including some south of the Denali Highway, were blazed before formation of the TLAD by local residents using dozers, generally to provide access to areas for fishing and hunting.

Most OHV activity on Denali Highway lands is on existing OHV trails, (from east to west) the Landmark Gap Trail, the Glacier Gap Trail, and the Maclaren Summit Trail. The first one-third mile of the Seven Mile Lake is in the TLAD/SUA, and the rest of the trail in Denali Block I. Other OHV trails exist in Denali Blocks I and II, including the historic Yost Trail (Figure 10) in the Eureka Creek drainage of Denali Block I, numerous trails in the historic mining district in Denali Block II East, and the Butte Creek Trail in Denali Block II West. While four-wheel drive highway vehicles are used on some trails like Landmark Gap Trail, smaller one-person OHVs are the main vehicles used on other trails. Archaeological sites are particularly threatened by OHV use where trails are braided at wet locations and when new trails are created. Both Glacier Gap Trail and Seven Mile Lake Trail have braided sections where wet peat deposits cause users to pioneer new trails around mud holes to stay on solid ground. Glacier Gap and Landmark Gap trails have short trails pioneered off their ends. The challenge to DNR management is to have useable trails that serve the public needs, and to discourage users from pioneering new routes.

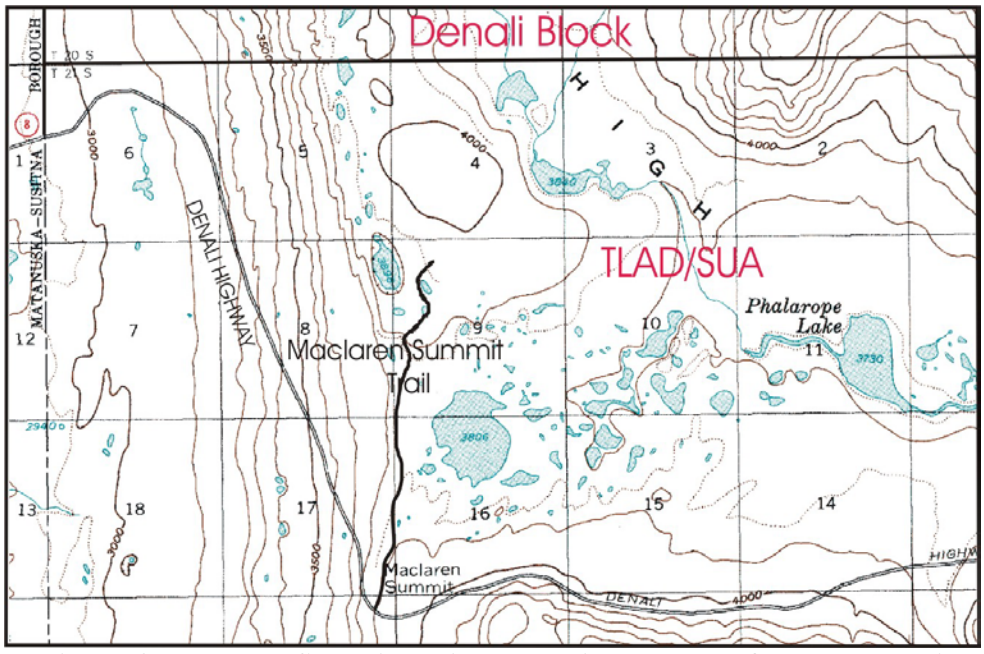


Figure 6. Maclaren Summit Trail. The trail runs north from the Denali Highway approximately 2.3 miles, and lies completely within the TLAD/SUA. Trail is from a trackway recorded in 2003 by a Garmin Map 76S GPS unit. An additional ~250m extension was discovered to have been pioneered by August 2005.

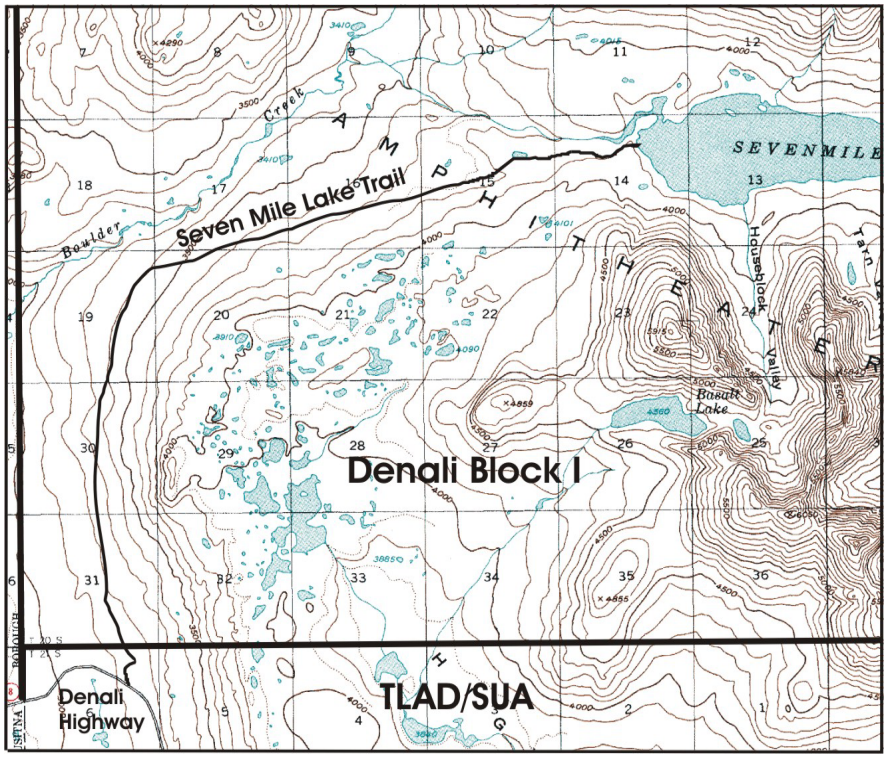


Figure 7. Seven Mile Lake Trail. The trail progresses north and east from the Denali Highway 7.5 miles to Seven Mile Lake. The trail travels approximately .3 miles/.6 km through the TLAD/SUA and then through Denali Block I to the lake. Trail from trackway recorded in 2003 by Garmin Map 76S GPS unit.

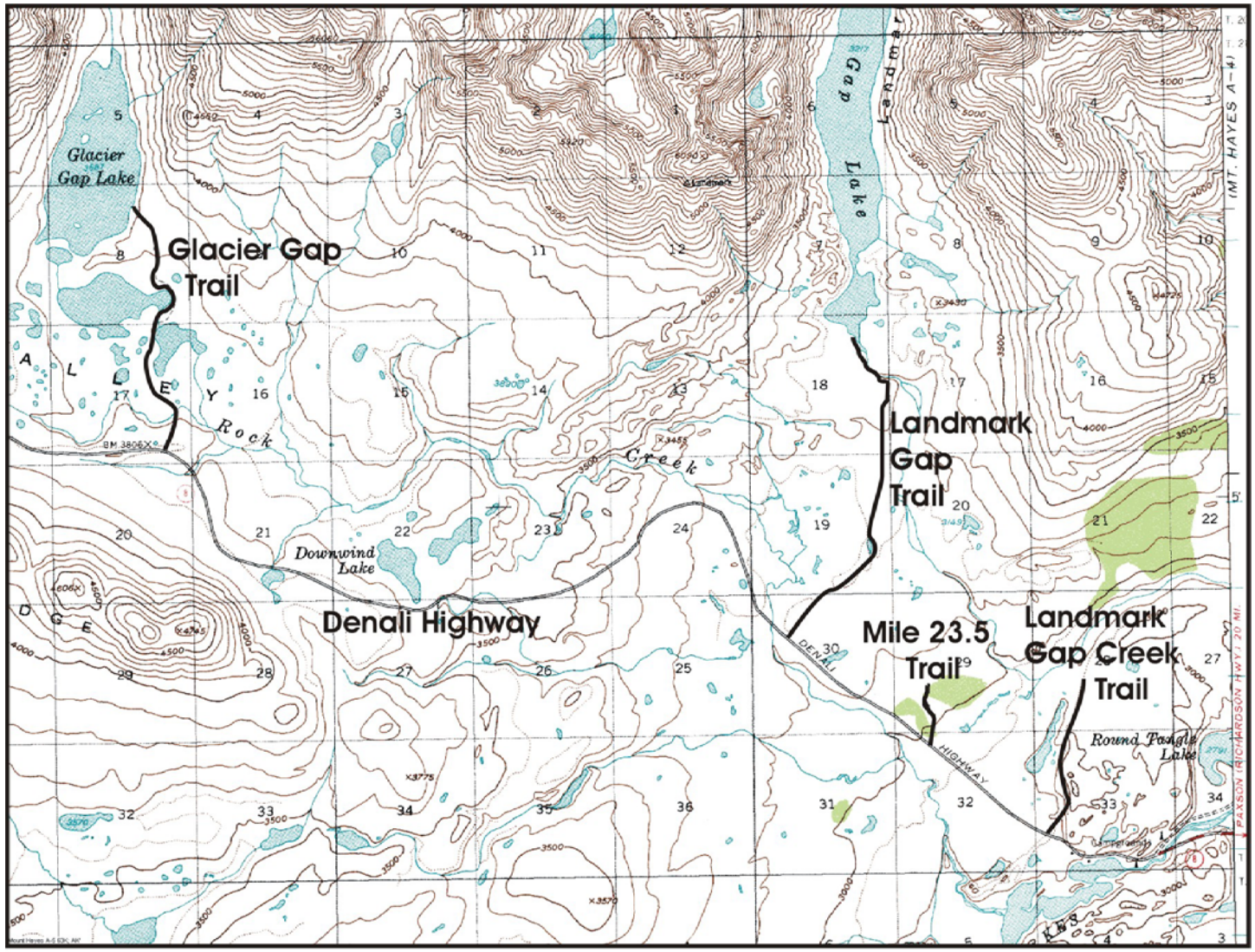
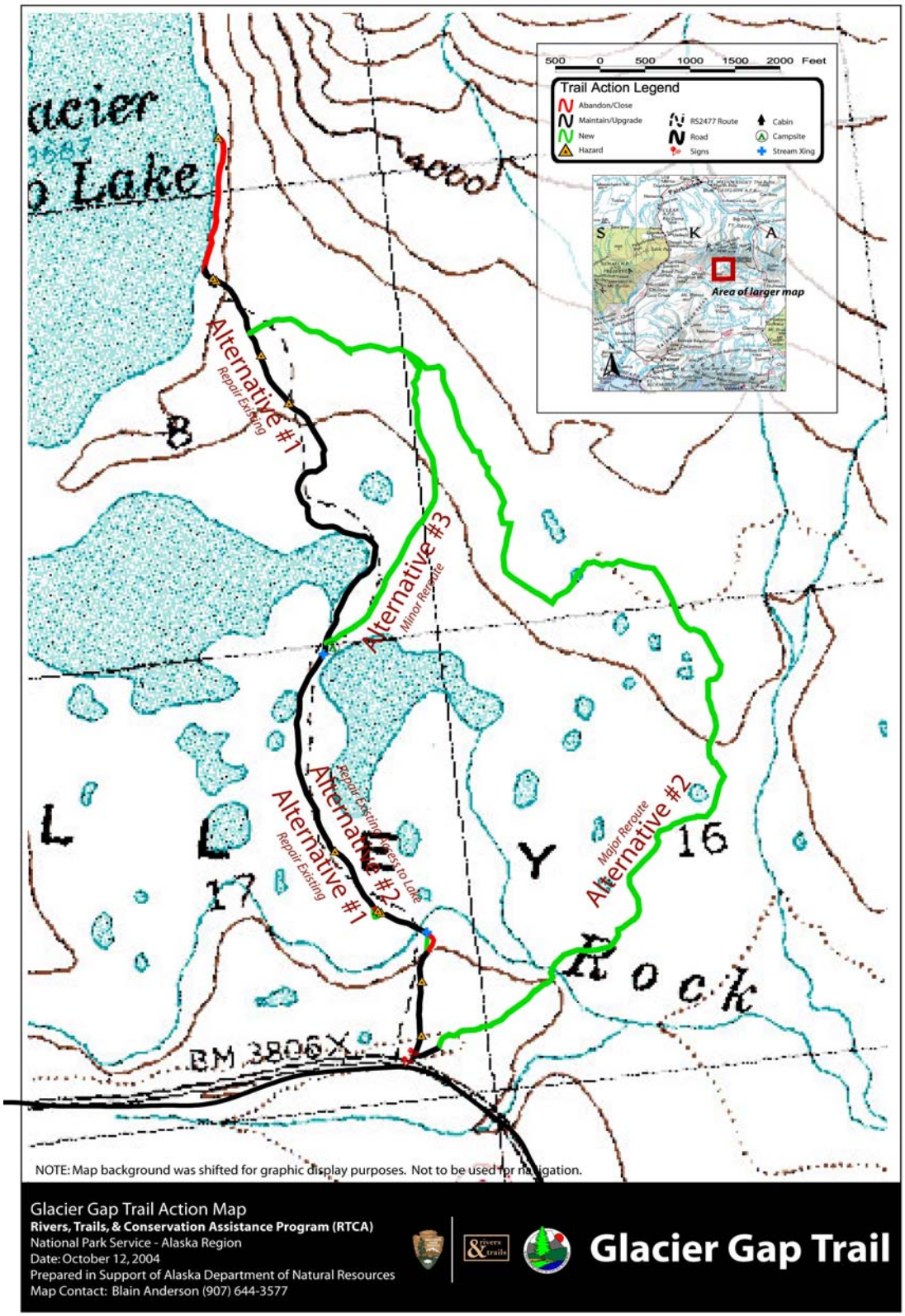


Figure 8. OHV trails, Mile 22 to Mile 31, Denali Highway. The "Mile 23.5 Trail" and "Landmark Gap Creek Trail" are unauthorized OHV trails.



Preliminary Draft
Figure 9.

Trail Name	Map Quad	Block Location	Trailhead Location	Trail Length	RS2477 Trail	NatReg Status/ Date	Archaeo. Surveyed /Cleared	Trail Conditions and Concerns	Recommendations
Landmark Gap (North) Trail	Mt. Hayes A-5	TLAD/SUA, in Denali Block 1	Mile 24.7 Denali Highway	2.4 miles	No	NDE	Yes/Yes	Erosion on Landmark Gap Trail Site; several braided mudholes: newly pioneered trails on side and end.	Lay geomat or other over trail at LGT Site and cover w gravel to stop site destruction.
Glacier Gap Trail	Mt. Hayes A-5	TLAD/SUA, in Denali Block 1	Mile 30.6 Denali Highway	2.25 miles	Pending	NDE	Yes/Yes	Braided marshy sections, esp. mile 1-2; .3 mile unauthorized trail extension.	Archaeologically survey areas near rerouted trail.
Maclaren Summit Trail	Mt. Hayes A-5	TLAD/SUA, in Denali Block 1	Mile 36.8 Denali Highway	2.2 miles	No	NDE	Yes/Yes	Solid gravel bottom. Gradual pioneering at end of trail.	Construct turn-around loop at end of trail or extend trail out of SUA, &survey.
Seven Mile Lake Trail	Mt.H. A-5	TLAD/SUA & D. Bk. 1	Mile 39.7 Denali Highway	7.5 miles	No	NDE	Yes/Yes	Braiding at marshy sections.	Arch. survey any rerouted trail.
Landmark Gap Creek Trail	Mt.H. A-5	TLAD/SUA, in D. Bk. 1	Mile 22.2 Denali Highway	1.6 miles	No	NDE	Yes/No	Unauthorized trail; crosses several archaeological sites.	Close trail to OHV use.
Mile 23.5 Trail	Mt. Hayes A-5	TLAD/SUA, in Denali Block 1	Mile 23.5 Denali Highway	640m	No	NDE	Yes/Yes	Unauthorized, unsigned trail. Trail closed in 2005.	Continue monitoring.
Rusty Lake Trail	Mt.H. A-4	TLAD/SUA, in D. Bk. 1	Mile 17.4, Denali Highway	Approx. 1 mile	No	NDE	Yes/Yes	OHV trail cleared by BLM in 1990s. Poorly marked at trailhead and in spots.	Work with DNR Lands
Yost Trail	Mt.H. A-4,5 B-4,5	Denali Block 1	~Mile 221, Richardson Highway	~18 miles,10 in DBI	No	NRJ (Rejected) 6/8/87	Yes/Yes	Braided sections; locations with high archaeological potential near trail.	Work with DNR Lands
Rainy Creek Trail	Mt.H. B-4,5	Denali Block 1	~Mile 228, Richardson Hwy	>17 miles	No	NDE	No/No	Unknown; appears 1.5 lane gravel road from air.	Archaeologically survey.
Paxson/Denali Trail	Healy A-1,2 Mt.H. A-6	Denali Bk 2, State Selected Land	Mile 44, Denali Highway	40 Miles	Yes	NDE	No/No	W. 14 miles is gravel road; condition of trail east of Roosevelt Lake is unknown.	Section east of Roosevelt Lake needs arch. survey.
Windy Creek Trail/Access Road	Healy A-1	Denali Block 2	Mile 78, Denali Highway	16 miles	Yes	NDE	No/No	Unknown; said to be improved cat trail.	Archaeologically survey.

Table 2
Cultural Resource Management Considerations for Trails on State lands in the Denali Highway Region.
(NDE= No Determination of Eligibility determined for the National Register of Historic Places.)

Glacier Gap Trail

DNR/DMLW personnel in 2004 worked with National Park Service (NPS) trail specialists to map the Glacier Gap Trail (Figure 9) and consider upgrade alternatives. Workers surveyed the region, and mapped and flagged three alternative routes from the Glacier Gap trailhead to the trail terminus at the cabin at Glacier Lake. One trail option is to improve the existing trail, requiring the hardening of a long stretch of swampy ground. A second alternative is to relocate the trail to the foot of a glacial moraine that runs to the east of the existing trail. A third alternative is to only relocate the last half of the trail around the swampy area. Option three requires avoiding a known late prehistoric site on top of the esker above the proposed trail. Options two and three required an archaeological survey of the proposed new trail routes, which was done in 2005.

Rusty Lake Trail

An OHV trail located within the TLAD/SUA runs from Mile 17.4 of the Denali Highway north to Rusty Lake. This trail was archaeologically cleared in the 1990's by BLM archaeologists as a goodwill gesture toward lodge owners in the region, who wanted motorized access for fishing in Rusty Lake. A walking survey performed by OHA personnel in 2003 along the highway and then to and around Rusty Lake showed no distinct trail still in existence. In 2004 DNR/DMLW personnel were shown where the trail had left the highway by one of the lodge owners, with little evidence left of the former trail (Darcy Harris, personal communication 2005). In 2005 DNR/DMLW and OHA personnel walked the trail to Rusty Lake. The trail is flat, with little elevation gain. Some sections near Rusty Lake may need hardening, and other sections require better trail marking.

Newly Pioneered OHV Trails in the Tangle Lakes Archaeological District/ Special Use Area

New OHV trails in the TLAD/SUA exist along Landmark Gap Trail, Glacier Gap Trail, and at two locations on the north side of the Denali Highway between the Tangle Lakes Lodge and the Landmark Gap (North) trailhead. The "Mile 23.5 Trail" (Figure 8) is a 700m long trail pioneered north from a pull off on the highway at Mile 23.5. After consultation with DNR/DMLW it was decided that the pull off should be left available for use but the trail should be closed. DNR/DMLW worked with Alaska DOT to have the trail blocked by boulders.

The "Landmark Gap Creek Trail" (Figure 8) is an OHV trail that leaves a gravel pit at Mile 22.2, in the BLM Delta River Wild and Scenic River Corridor, and goes north 1.7 km into the TLAD/SUA. Consultation is ongoing with DNR/DMLW and BLM to decide whether to close this trail or whether it should be reopened as a walking trail. Any option other than trail closure will require OHA involvement.

RS2477 Trails on Denali Highway Lands

Some trails on Denali Highway lands are designated as RS2477 trails: that is, they are trails that grant an historic right-of-way for use. The main one of these is the Paxson-Denali RS2477 Trail, which follows the existing Denali Highway for its easternmost 44 miles. It then turns north and west, crossing the Maclaren River and Clearwater Creek, and cuts through the Pass Creek Valley into the Valdez Creek drainage, which it follows

to the Denali Highway. The western 20 miles of this trail lie in Denali Block II, with all but the four miles of trail east of Roosevelt Lake passable by four-wheel-drive highway vehicles.

The Windy Creek Access Road RS2477 Trail leaves the Denali Highway at Mile 78 and extends north and east 16 miles up the Windy Creek Valley to Wedding Pass. All of this trail, which allows access to mines in the upper Windy Creek Valley, is inside Denali Block II.

The Glacier Gap Trail has been nominated as a potential RS2477 right-of-way. This entire trail lies in Denali Block I. DNR is evaluating the trail and considering improving the existing trail or moving it to dryer ground (Figure 9).

The RS2477 process is still ongoing in the State of Alaska. Denali Highway lands like Valdez Creek and Eureka Creek that have seen mining and other uses for the last century may have other RS2477 eligible trails. It is probable that as more of the Denali Highway lands are considered for increased mineral and other development, some users will request RS2477 designation on additional trails. These routes need archaeological survey.

The Yost Trail

The Yost Trail historically linked the Yost Roadhouse on the Valdez-Fairbanks Trail (now the Richardson Highway) to the town of Denali near the Susitna River. A section of this trail is still visible, stretching from Phelan Creek on the Richardson

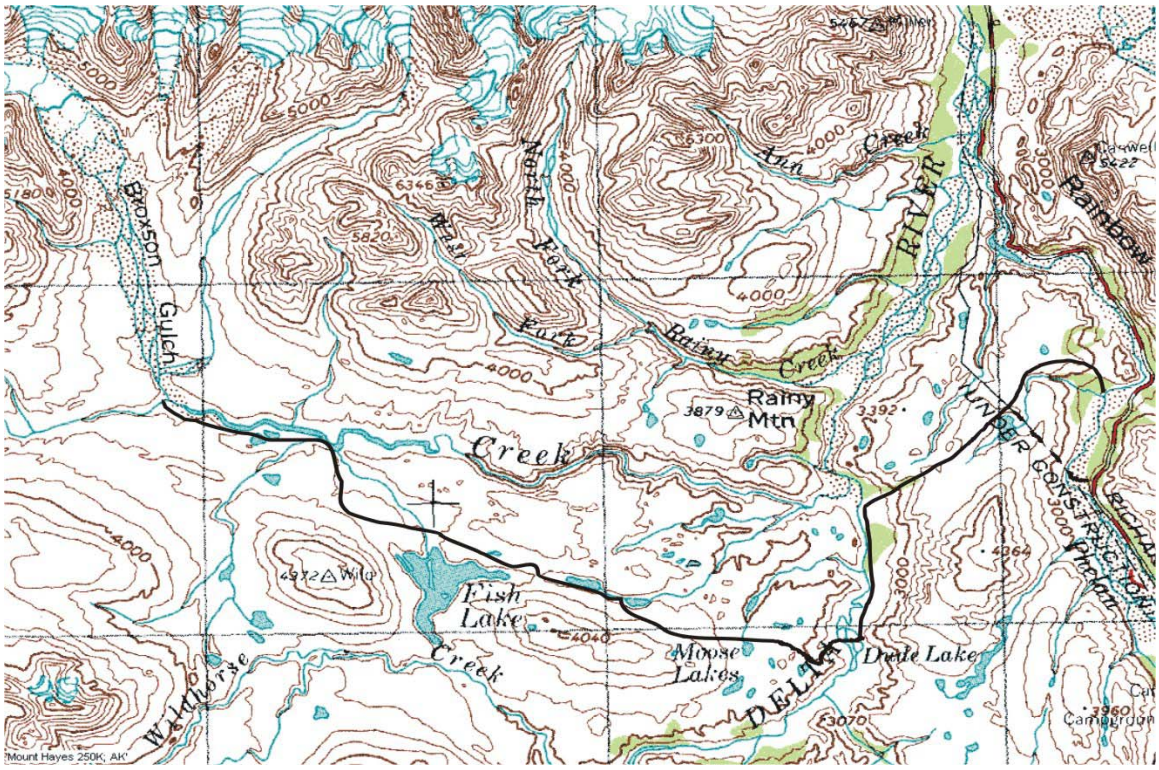


Figure 10. Yost Top-of-the-World Trail. Trail is still visible in the field, and passable from the Richardson Highway to Broxson Gulch. Current access to trail is from Trans-Alaska Pipeline corridor (dashed line).

Highway approximately 25 miles to Broxson Gulch in the Eureka Creek drainage (Figure 10). This trail has been periodically used by hunters and miners accessing upper Eureka Creek and Broxson Gulch. The Yost Trail crosses the BLM Delta Wild and Scenic River Corridor, but is open for general OHV use across the corridor, provided that users stay on the trail. Although beaver dams have flooded the trail route across the Delta River Valley, most of the trail is in fair to good condition. No known cultural sites in the Yost Trail would be impacted by increased use (one site in the trail was mitigated in 1988), but increased use of the trail would bring known sites, and areas with high site potential near the trail, into higher public use. The Yost Trail is currently not a listed RS2477 trail, but it may qualify as one due to apparent periodic use since the early 20th century.

Resource Extraction on Denali Highway Lands

Mining operations are ground-disturbing activities. Mine portals, open pits, tailings storage facilities, employee facilities, mill sites, new roads, test pits, etc. and associated effects of increased road traffic and new OHV trails, must take into account effects on cultural resources in the region.

Other Commercial Development

Commercial development on Denali Highway lands may include guiding, lodges, and other operations. When considering the possible environmental effects of these operations, their possible direct and indirect impacts on cultural resources must also be taken into account.

Road Modification or Development

Any soil disturbance, including changing alignments of existing roads, putting in new roads, and beginning or expanding material sources, has the potential to damage or destroy archaeological sites. Any proposed road-related ground disturbance needs to be reviewed for potential effects on archaeological sites, and archaeological survey might need to be done before construction.

Artifact Collecting on Denali Highway Lands

The lack of public awareness and appreciation for the cultural and archaeological resources on Denali Highway lands threaten the cultural resources. It is against the law to collect artifacts on state land. Human impacts to the cultural resources of the Denali Highway region can be reduced by encouraging visitors to be good stewards of those resources. This can be accomplished by increasing public awareness of the personal and social value of cultural resources, the susceptibility of those resources to human impacts, and how these impacts can be minimized with restrictions and laws related to protecting those resources (BUCY Associates 1999). Information can be presented to the public through displays, pamphlets and video productions available at local lodges, interpretive panels, and possibly public programs offered periodically.

Natural Disturbance Factors

Site Effects Caused by Natural Erosion

The natural erosional effects of wind and water impact numerous archaeological sites in the Denali Highway region. The Zinck and Zinck report (1976) has noted that 40% (N=72) of the sites they examined in the TLAD were affected by wind or water erosion. OHA's 2004 monitoring in the Southern Landmark Gap region found considerable wind erosion, down-slope movement of flakes, and human impact from foot traffic at some of the sites. The site most impacted by stream erosion in the TLAD/SUA is XMH-403, a site located on the stream edge of a pull-off on Landmark Gap Trail near Landmark Gap Lake. The erosion in this case is from a combination of rain and stream erosion coupled with foot traffic to the stream.

Melting of Regional Ice Patches and Cirque Glaciers

Ice patches are locations where caribou congregate in the summer to cool off and escape insect predation. Hunters in the past looked for caribou, sheep and other animals in these locations. Artifacts, such as darts and arrows, made from organic materials, were lost on these ice patches, and preserved within the ice. Canadian research shows that ice patches frozen for thousands of years have been rapidly melting since the early 1990s.

OHA's research designs over the last three years have included monitoring multiple ice patches in the Denali Blocks. Ice patches surveyed in 2003 in the western Amphitheater Mountains produced two arrow shafts and two antler points, as well as worked antler and fragments of birch bark. Monitoring in the same region in 2004 recovered a fragment of arrow or dart shaft and three lithic points; all recovered from caribou dung where an ice patch had melted. Survey of ice patches in the eastern Amphitheater Mountains in 2004 recovered a wooden shaft that may be an atlatl (spearthrower), the first recovered from the boreal forests of North America (Figure 11). These recovered items illustrate the possibility of finding cultural material in receding or former ice patches, and highlight the importance of monitoring the ice patches and related cirque glaciers now, as they are rapidly melting away.

Figure 11. Delta River Ice Patch No. 5. This ice patch, seen here in 2003, had completely melted away by 8/31/04, when OHA personnel recovered a possible atlatl from atop the remaining caribou dung. Caribou dung is visible on lower sections of ice patch. Ice patch is located on mountaintop west of Lower Tangle Lake at approx. 5350' elevation.